APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/225,189	01/05/1999	RICHARD J. QIAN	SLA0095	2766

20575 7590 11/18/2004	EXAMINER	
MARGER JOHNSON & MCCOLLOM PC	HANNETT, JAMES M	
1030 SW MORRISON STREET		
PORTLAND, OR 97205	ART UNIT	PAPER NUMBER
	2612	

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<table>
<tr><td rowspan="2">Office Action Summary</td><td>Application No.
09/225,189</td><td>Applicant(s)
QIAN, RICHARD J.</td></tr>
<tr><td>Examiner
James M Hannett</td><td>Art Unit
2612</td></tr>
</table>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>29 September 2004</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-10</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-10</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>31 December 2002</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 9/29/2004 have been fully considered but they are not persuasive. The applicant argues that the new limitation "classifying each pixel in the input image as a foreground pixel or a background pixel by calculating the probability function directly <u>from a formula</u> for each pixel in the input image" is not taught by the prior art. The applicant further argues that indexing into a table and electing a value based upon an index does not constitute performing <u>a formula</u>. The Examiner disagrees with the applicants assertion. As taught by Brady et al on Column 8, Lines 14-20 after a difference image is calculated the difference image is sent to a lookup table module whose lookup table stores information based on the weighted curve. Brady teaches that the lookup table then outputs the resulting foreground weights, which are a measure of probability that a pixel is in the foreground. The process of inputting a difference image value and outputting a corresponding lookup table value that correspond to a measure of probability that a pixel is in the foreground, is viewed by the examiner as determining the probability function <u>from a formula</u>. The examiner views any mathematical process as a formula. In Brady et al an input number is input into a look-up table and based on the value of the input difference image, a formula determines which value in the lookup table is output. Therefore, the probability is determined based on a formula.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1:      Claims 1, 2, 4-6,9,10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

USPN 5,914,748 Parulski et al in view of USPN 5,684,898 Brady et al.

2:      As for Claim 1, Parulski et al teaches on Column 1, Lines 38-43 the use of having an

electronic imaging system take multiple images, including an image of a subject plus background

and an image of the background without a subject. Parulski et al teaches on Column 1, Lines 43-

58 how the two images can be compared and the object in the foreground can be separated from

the background; Parulski et al teaches in Figure 1 the step of separating foreground and

background images using the difference between a first and second image. Purlaski et al further

teaches in Figure 2, and on Column 3, Lines 47-64 the details of the difference calculation.

Parulski et al further discusses in Column 3, Lines 30-40 that the comparison of the two images

to classify the background image are performed on a pixel-by-pixel basis. Parulski et al teaches

on Column 3, Lines 39-45 that an additional processing or refining step is necessary to create a

suitable foreground mask image. Parulski et al depicts in Figure 1 a method of replacing an

original background image with image data from a different background. Parulski et al teaches

on Column 6, Lines 15-17 that border feathering can be utilized to better enhance border effects.

Parulski et al further teaches on Column 2, Lines 37-44 that a new composite image is formed

from the combination of the original foreground and new background image.

        Parulski et al does not specifically state that the calculation performed during image

foreground determination is performed using a probability function. Parulski et al further does

not teach using weighted values for pixel values of the input image and the different background

determined by the probability map.

Brady et al teaches a method for subtracting the background from an image with a foreground and background. Brady teaches the method for characterizing the background pixels from the foreground pixels involve the use of a probability function Column 8, Lines 14-19. Bradley teaches on Column 8, Lines 14-33 that the probability that a pixel is in the foreground is calculated for each pixel in the image and a foreground weight image is formed. Therefore, because a probability value is calculated for each pixel in the image, a two-dimensional representation of pixels each with a corresponding probability of being a background image is formed, This is viewed by the examiner as a probability map; Column 7, Lines 46-49. Furthermore, Brady et al teaches on Column 8, lines 15-24 the use of using image weighted values for pixel values of the input image and the different background determined by the probability map. In Brady et al an input number is input into a look-up table and based on the value of the input difference image, a formula determines which value in the lookup table is output. Therefore, the probability is determined based on a formula.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the step of classifying the foreground pixels from the background pixels using a probability function as taught by Brady et al in the method for generating composite image of Parulski et al in order to better classify the foreground pixels from the background pixels.

Furthermore, Parulski et al teaches the method of first capturing an image with a foreground object and a background, and second capturing an image with just a background object. It would have been obvious to one of ordinary skill in the art at the time the invention was made to capture first the background with no foreground and capturing second an image with a

background and a foreground. This is because the processing to determine the background and foreground pictures is performed after both pictures are taken.

3:      As for Claim 2, Parulski et al teaches on Column 3, Lines 65-67 and Column 4, Lines 1-25 that the additional processing step or refining step is performed separately for each R,G,B color layer. Parulski et al teaches that the additional processing step processes the R, G, and B difference images by separate RGB lookup tables. This is equivalent to processing in normalized RGB chromatic color space.

4:      In regards to Claims 4-6, Parulski et al teaches on Column 5, Lines 1-20 that the background replacement technique can be applied to moving subjects as well as still subjects. Parulski et al further teaches that multiple background plus subject images or just a single background plus subject image can be taken.

5:      As for Claim 9, Parulski et al teaches on Column 5, Lines 1-20 that the background replacement technique can be applied to moving subjects and that the camera can be driven to capture a motion sequence of images or video.

6:      As for Claim 10, Parulski et al teaches on Column 3, Lines 20-22 that the new composite image is displayed on a monitor or printed using a printer. Therefore, the printed image constitutes an outputted still image.

7:      Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,914,748 Parulski et al in view of USPN 5,684,898 Brady et al in further view of USPN 5,382,980 Gehrmann.

Parulski et al in view of Brady et al teaches the claimed invention as discussed above in Claim 1, Parulski et al teaches on Column 3, Lines 65-67 and Column 4, Lines 1-25 that the

additional processing step or refining step is performed separately for each R,G,B color layer.

Parulski et al teaches that the additional processing step processes the R, G, and B difference

images by separate RGB lookup tables. Parulski et al does not teach that the refinement step or

additional processing step can be performed in YCbCr color space. Gehrmann teaches in the

abstract a method for background replacement of an image that has a further improvement

process having the background and foreground signals comprised of a red component (Cr), a

blue component (Cb) and a luminance component (Y). Gehrmann teaches that this method is

advantageous because an improvement of the picture quality can be achieved while using a

smaller number of components. Therefore, It would have been obvious to one of ordinary skill

in the art at the time the invention was made to perform the refining step as taught by Parulski et

al in the YCbCr color space as taught by Gehrmann in order to achieve an improvement of the

picture quality while using a smaller number of components

8:      Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,914,748

Parulski et al in view of USPN 5,684,898 Brady et al in further view of USPN 5,825,909 Jang.

       Parulski et al in view of Brady et al teaches the claimed invention as discussed above in

Claim 1, Parulski et al teaches on Column 3, Lines 43-46 that an additional refining step is used

to better classify foreground pixels and background pixels. Parulski et al teaches that this process

can be achieved by utilizing a noise reduction algorithm to reduce the noise in the difference

image. Parulski et al does not teach that the additional processing step can use anisotropic

diffusion to better classify the foreground and background pixels. Jang teaches on Column 6,

Lines 47-66 that the first step for segmenting an image is the step of image smoothing. Jang

further teaches on Column 7, Lines 40-47 that anisotropic diffusion filters may be used for the

image-smoothing step. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Parulski et al to utilize the image segmentation process of Jang that includes a first step of image smoothing using an anisotropic diffusion filter for the refining step in order to better segment the foreground image from the background image.

9:     Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,914,748 Parulski et al in view of USPN 5,684,898 Brady et al in further view of USPN 5,710,602 Gardos et al.

Parulski et al in view of Brady et al teaches the claimed invention as discussed above in Claim 1, Parulski et al teaches on Column 3, Lines 43-46 that an additional refining step is used to better classify foreground pixels and background pixels. Parulski et al teaches that this process can be achieved by utilizing a noise reduction algorithm to reduce the noise in the difference image. Parulski et al does not teach that the additional processing step can use morphological filtering to better classify the foreground and background pixels. Gardos et al teaches on Column 8, Lines 33-37 that it is advantageous to use a morphological filter after an initial pixel-level mask is generated in order to decrease the false foreground detections, which tend to occur along stationary edges. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to perform morphological filtering as taught by Gardos et al in the additional processing step of Parulski et al in order to decrease the false foreground detections which tend to occur along stationary edges.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M Hannett whose telephone number is 703-305-7880. The examiner can normally be reached on 8:00 am to 5:00 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James M. Hannett
Examiner
Art Unit 2612

JMH
November 11, 2004

WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600